

WHAT IS CLAIMED:

- 1 1. A method of generating a reinforced
2 polymer, the method comprising:
3 providing particles of the layered silicate and
4 a supercritical fluid;
5 mixing the layered silicate particles with a
6 polymer to form a treatable silicate-polymer mixture;
7
8 contacting the treatable mixture with the
9 supercritical fluid to exfoliate the silicate so that the
10 silicate particles disperse within the polymer; and
11 depressurizing the contacted mixture to
12 exfoliate the silicate particles so that the layers are
13 substantially dispersed within the polymer to define a
14 reinforced polymer.
- 1 2. The method of claim 1 wherein the
2 supercritical fluid is carbon dioxide.
- 1 3. The method of claim 1 wherein contacting
2 the mixture includes pressurizing the mixture with the
3 supercritical fluid to above the critical pressure of the
4 supercritical fluid.
- 1 4. The method of claim 1 wherein contacting
2 the mixture includes heating the mixture with the
3 supercritical fluid to above the critical temperature of
4 the supercritical fluid.
- 1 5. The method of claim 1 wherein contacting
2 the mixture includes maintaining contact for between 0.5
3 minute and 10 hours.

1 6. The method of claim 1 wherein the silicate
2 particles are substantially singly dispersed upon
3 depressurization.

1 7. The method of claim 1 wherein the
2 reinforced polymer includes between about 0.1 and 40
3 percent weight of the silicate particles.

1 8. The method of claim 1 wherein mixing
2 includes shearing the silicate-polymer mixture.

1 9. A reinforced polymer comprising:
2 a polymer; and
3 a layered silicate having particle layers
4 exfoliated by a supercritical fluid, the particle layers
5 being substantially dispersed within the polymer to
6 provide reinforcement to the polymer.

1 10. The reinforced polymer of claim 9 wherein
2 the supercritical fluid is carbon dioxide.

1 11. The reinforced polymer of claim 10 wherein
2 the supercritical fluid is pressurized above about 1100
3 pounds per square inch gauge and at a temperature above
4 about 30 degrees Celsius.

1 12. The reinforced polymer of claim 9 wherein
2 the layered silicate comprises between about 0.1 and 40
3 percent weight of the reinforced polymer.